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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,574	12/04/2003	Thomas G. Anderson	010-03-002	2289

7590   10/05/2009

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EXAMINER
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ART UNIT	PAPER NUMBER
2173	

MAIL DATE	DELIVERY MODE
10/05/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/729,574	ANDERSON, THOMAS G.
	Examiner	Art Unit	
	Blaine Basom	2173	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 July 2009*.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3-32 and 34-38* is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *3-32 and 34-38* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☐ All   b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)
1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

U.S. Patent and Trademark Office
PTOL-326 (Rev. 08-06)   Office Action Summary   Part of Paper No./Mail Date 20090929

DETAILED ACTION

This Office action is responsive to the Request for Continued Examination (RCE) filed

under 37 CFR §1.53(d) for the instant application on July 9, 2009.   The Applicants have

properly set forth the RCE, which has been entered into the application, and an examination on

the merits follows herewith.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 3-8, 11-13, 19-24, 26-30, and 35-37 are rejected under 35 U.S.C. 102(b) as being

anticipated by U.S. Patent No. 6,219,032, which is attributed to Rosenberg et al. (and hereafter

referred to as "Rosenberg"). In general, Rosenberg presents a human/computer interface device

in conjunction with a graphical user interface, whereby the interface device is used to affect the

motion of a cursor, and other objects, which are displayed in the graphical user interface. Force

feedback is provided to the interface device in order to inform the user of graphical objects

encountered by the cursor (see column 2, line 53 – column 3, line 6). Consequently, Rosenberg

is considered to teach a method, implemented within a human-computer interface, for allowing a

user of a haptic input device to affect the motion of an object in a computer application.

Specifically regarding claim 3, Rosenberg teaches:

(a) *establishing an object fundamental path* (i.e. a groove) *representing a path of motion of an*

object (e.g. a cursor or scroll bar "thumb") *in a computer application* (e.g. an operating system).

Rosenberg discloses that a particular type of force feedback can be applied to the interface

device, namely a "groove" force. According to Rosenberg, this groove force provides a detent

sensation along a line – to make the interface device feel like it is captured in a groove (see

column 38, line 38 – column 39, line 9). While the interface device moves along this groove, no

force is applied to the device. However, if the interface device attempts to move out of the

groove, a force is applied resisting the device's movement out of the groove (see column 38, line

38 – column 9, line 39). Rosenberg discloses that a groove force can be applied to a cursor, such

that when the cursor is moved into a groove, resistive forces are applied to resist movement out

of the groove, but freely allow movement along the length of the groove (see column 57, line 30

– column 58, line 8). This groove force is considered applicable to other user interface objects,

as well as a cursor. For example, a groove force may also be applied to a scroll bar or slider

"thumb" such that the user is freely able to drag the thumb along the length of the scroll bar, but

movement out of the scroll bar is resisted (see column 59, line 49 – column 60, line 39).

Consequently, a groove is considered an "object fundamental path," like that of the claimed

invention, as it represents a path of motion of an object in a computer application. This force

feedback described by Rosenberg may be applied within various types of applications, such as an

operating system (for example, see column 6, lines 55-65).

(b) *establishing a device fundamental path in correspondence with the object fundamental path.*

Since the position of the interface device corresponds to the position of the object (see column 2,

line 67 – column 3, line 7), Rosenberg is also considered to teach establishing a device

fundamental path, representing a path of the interface device, and corresponding to the groove.

(c-e) *detecting motion of a haptic input device, moving the object in the computer application*

along the object fundamental path responsive to a component of haptic input device motion

along the device fundamental path, and while the user moves the haptic input device along the

device fundamental path, applying a first force to the haptic input device responsive to a

component of haptic input device motion not along the device fundamental path. Rosenberg

discloses that the object, such as a cursor or scroll bar thumb, is moved along the groove in

response to a component of input device motion along the device fundamental path, and a

resistive force is applied to the interface device in response to a component of input device

motion not along the device fundamental path (see e.g. column 59, line 49 – column 60, line 13).

(f) *and simultaneously applying a second force to the haptic input device responsive to*

interaction of the object with the application. Rosenberg suggests that additional forces may be

simultaneously applied, while the user moves the haptic input device along the device

fundamental path, in response to interaction of the object (i.e. the cursor or scroll bar thumb)

with the application. For example, within a scroll bar associated with a groove force, it is

apparent that "inertia," "collision," and other external forces (e.g. external forces from arrow

buttons) may additionally be applied while the user moves the haptic input device along the

device fundamental path, i.e. when the user moves the cursor along the scroll bar (see e.g.

column 56, lines 20-59; and column 59, line 49 – column 60, line 45).

Accordingly, Rosenberg is considered to teach a method like that of claim 3, which is for

allowing a user of a haptic input device to affect the motion of an object in a computer

application.

In reference to claim 4, Rosenberg teaches applying forces to the interface device

corresponding to the motion of the object in an application, wherein the forces provide a

perception of momentum and inertia of the input device corresponding to the momentum and

inertia of the object. For example, Rosenberg discloses that the above-described thumb may

have a simulated mass, such that the user feels the inertia of the thumb when dragging it with a

cursor (see column 59, line 49 – column 60, line 29). Rosenberg similarly discloses that the

cursor itself may have a simulated mass, which may be used to apply appropriate force feedback

to the interface device in response to interaction of the cursor with objects within the graphical

user interface (see column 60, lines 46-62).

Regarding claims 5 and 6, Rosenberg discloses that the user can change the size of a

window within the GUI (see e.g. column 52, lines 30-35; and column 57, lines 9-17). It is

apparent that in doing so, the size of the scroll bar within the window is likewise changed, as is

known in the art. Accordingly, the application has a plurality of states, each associated with a

different size of the window), and wherein the shape of the object fundamental path (i.e. the size

of the "groove" force associated with the scroll bar) and the corresponding device fundamental

path is dependent on the state of the application.

In regard to claim 7, Rosenberg teaches that a cursor may interact with an application,

wherein the interaction of the cursor with the application is dependent on the speed of the cursor

(for example, see column 60, lines 30-62). It is therefore understood that a cursor may interact

with the application, dependent upon the speed of the cursor, particularly as the cursor moves along a groove.

Referring to claim 8, Rosenberg teaches displaying a visual representation of the object (e.g. the cursor) to the user, particularly within a graphical user interface (for example, see column 2, line 60 – column 3, line 11).

With respect to claim 11, the cursor of Rosenberg is considered to comprise two representations: a visual representation that is used in a display to provide visual feedback to the user (for example, see column 2, line 60 – column 3, line 3), and an interaction representation that is used with the interface device to provide force feedback to the user (for example, see column 60, lines 30-62).

Concerning claim 12, Rosenberg describes a groove (i.e. the "first force") associated with the scroll bar, such that if an interface device attempts to move out of a device fundamental path corresponding to the groove, a force is applied resisting the device's movement, as is described above. This force has a first magnitude for a first position of the interface device a first distance from the device fundamental path, and a second, larger magnitude for a second position of the interface device a second, larger distance from the device fundamental path (see e.g. figure 15; column 38, line 38 – column 39, line 9; and 59 line 49 – column 60, line 13).

Regarding claim 13, Rosenberg teaches applying a "capture" or "barrier" force along a device fundamental path corresponding to a groove, wherein the force apposes motion of an interface device beyond an end of the device fundamental path (for example, see figure 21, and its corresponding description in column 59, line 65 – column 60, line 8). Such a capture or barrier force is considered a "third force" like claimed.

Regarding claims 19 and 20, Rosenberg describes a groove, such that if an interface

device attempts to move out of a device fundamental path corresponding to the groove, a force

(i.e. a first force) is applied resisting the device's movement, as is described above. In other

words, Rosenberg teaches that the force resists motion of the interface device off the device

fundamental path along a first dimension. Additionally, Rosenberg teaches that a characteristic

of an object in the application may be responsive to motion of the interface device off the device

fundamental path along a second dimension, different from the first dimension. For example, a

"command gesture" may be applied to the object in response to movement of the interface device

along this second dimension (see column 45, line 61 – column 46, line 19).

Regarding claims 21 and 22, Rosenberg describes scroll bar associated with a groove

force, whereby a second force may be simultaneously applied, responsive to interaction of the

object with the application, as the user moves a haptic input device along the device fundamental

path (i.e. as the user moves the cursor along the scroll bar), as is described above (see e.g. the

rejection for claim 3). Additionally, Rosenberg discloses that such a second force may be have a

magnitude dependent on the position of the cursor along the groove (see e.g. column 60, lines

14-23; and column 50, lines 49-52), and dependent on the interaction of the cursor with the

application (for example, column 60, lines 24-62). The second force applied to the interface

device is thus at least partly along the device fundamental path, and the magnitude of the second

force is partially dependent on the position of the cursor along the groove, i.e. object

fundamental path, and partially dependent on the interaction of the cursor with the application.

Concerning claims 23 and 24, Rosenberg discloses that the magnitude of the force

resisting the interface device's motion off of the device fundamental path (i.e. the first force) is

partially dependent on a parameter of the interface, namely a "magnitude parameter" (for

example, see column 38, lines 38-53). As a major goal of such force feedback is to assist the

user in targeting graphical user interface objects (see column 44, lines 50-64), this magnitude

parameter is considered a "user-assistance parameter," like recited in claim 23. Additionally,

Rosenberg discloses that the user may adjust such parameters to suit his or her needs, such that

presumably, the force could have a first non-zero magnitude or a second non-zero magnitude (for

example, see column 52, lines 54-59). The magnitude parameter may thus be established by a

measure of the user's proficiency in manipulating the interface device.

With respect to claims 26, 28, and 29, Rosenberg discloses that a groove force may be an

internal force, meaning that it is established once the user positions a cursor within a region

associated with the groove (see column 3, lines 37-49; and see column 59, line 49 – column 60,

line 13). Rosenberg also discloses that a hardware switch must be set to establish such forces

(see e.g. column 13, lines 36-64). Rosenberg thus teaches determining when the user establishes

a motion-initiation signal, which motion-initiation signal comprises an input (i.e. via the

hardware switch) from the user other than positioning of the object in a defined region, and a

determination of when the user positions a cursor within a region associated with a groove. In

response to detecting the motion initiation signal, an object fundamental path i.e. a groove, is

established. As this groove is associated with a corresponding device fundamental path, it is

understood that a device fundamental path is additionally established according to a defined path,

namely this groove, and a position of the cursor when the motion-initiation signal was supplied.

Concerning claims 27 and 30, Rosenberg teaches determining when the user establishes a

motion-initiation signal, specifically by determining when the user positions a cursor within a

region associated with a groove, as is described in the previous paragraph. The motion-initiation signal thus comprises motion of the cursor to a defined range of the cursor's motion, or in other words, motion of the input device having defined characteristics.

Specifically regarding claims 35 and 36, Rosenberg teaches: (a) establishing an object fundamental path (i.e. a groove) representing a path of motion of an object (e.g. a cursor or scroll bar "thumb") in a computer application (e.g. an operating system); (b) establishing a device fundamental path in correspondence with the object fundamental path and representing a path that can be followed by a haptic interface device; (c-e) detecting motion of a haptic input device, moving the object in the computer application along the object fundamental path responsive to a component of haptic input device motion along the device fundamental path, and applying a first force to the haptic input device responsive to a component of haptic input device motion not along the device fundamental path; and (f) and simultaneously applying a second force to the haptic input device responsive to interaction of the object with the application, as is described above (see e.g. the rejection for claim 3). Rosenberg further discloses that each of the objects (e.g. the cursor, scroll bar thumbs, windows, and icons) in the application, and their interactions, can simulate physical objects; each of the objects can have a mass and an associated inertia (see column 56, lines 20-59; column 60, lines 24-29; and column 60, lines 46-62). Accordingly, Rosenberg is further considered to teach a method like that of claims 35 and 36, which is for allowing a user to use a haptic interface device to control, in a computer presentation of the interaction of three or more objects simulating physical objects and simulating interactions among at least three of the three or more objects, the motion of a defined object of such objects.

As per claim 37, Rosenberg discloses that a hardware switch must be set to establish

forces such as those described above with respect to claim 35 (see e.g. column 13, lines 36-64).

Accordingly, Rosenberg is further considered to teach: (f) accepting a signal from the user (i.e.

via a hardware switch) indicating that a path interaction is desired, and, when the signal is

accepted, then moving the object according to d) and e) of claim 35; and (g) accepting a signal

from the user indicating that a path interaction is not desired (i.e. via a hardware switch), and,

when the signal is accepted, then moving a cursor in the computer presentation corresponding to

motion of the haptic interface device, as is claimed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over the U.S. Patent of

Rosenberg, which is described above, and also over U.S. Patent No. 5,655,093, which is

attributed to Frid-Nielson. As shown above, Rosenberg teaches a method like that recited in

claim 8, wherein particularly, an object fundamental path, namely a groove, is established to

represent a path of motion of an object in a computer application, and a corresponding device

fundamental path is established to represent a path an interface device must take in order to move

the object along the object device fundamental path. This object may be, for instance, a cursor

displayed within a graphical user interface, and the object fundamental path may be defined by a

groove applied to a scroll bar, such that the user is freely able to move the cursor along the length

of the scroll bar, but movement out of the scroll bar is resisted (see column 59, line 49 – column

50, line 39). As the device fundamental path represents a path the interface device must take in

order to move the cursor along the groove – the scroll bar in this case – it is understood that

when the device is not on the device fundamental path, the cursor is not within the bounds of the

scroll bar. Rosenberg, however, does not explicitly disclose that the cursor on the scroll bar is

perceptively different from the cursor off the scroll bar, or in other words, that the cursor when

the device is on the device fundamental path is perceptively different from the cursor when the

device is not on the device fundamental path, as is expressed in claim 9.

Like Rosenberg, which teaches providing force feedback in response to graphical objects

encountered by the cursor, Frid-Nielsen teaches providing feedback to the user in response to

graphical objects encountered by the cursor. Frid-Nielsen particularly teaches adjusting the

depiction of the cursor to provide information about which user inputs are available on the

objects encountered by the cursor. For example, and regarding the claimed invention, Frid-

Nielsen discloses that the appearance of the cursor may be altered when it is placed on a scroll

bar, the altered appearance indicating valid inputs of the user interface device (See column 8,

lines 29-48).

Therefore, it would have been obvious to one of ordinary skill in the art, having the

teachings of Rosenberg and Frid-Nielson before him at the time the invention was made, to

modify the cursor of Frid-Nielsen, such that it changes its appearance when placed on a scroll

bar, or in other words, such that the cursor when the device is on the device fundamental path is

perceptively different from the cursor when the device is not on the device fundamental path. It

would have been advantageous to one of ordinary skill to utilize such a combination because

such a modifiable cursor image provides information about system commands to the user, thus

creating a more intuitive user interface, as is taught by Frid-Nielsen (see column 3, lines 31-39).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over the U.S. Patent of

Rosenberg, which is described above, and also over U.S. Patent No. 6,191,785, which is

attributed to Bertram et al. (and hereafter referred to as "Bertram"). As described above,

Rosenberg teaches a method like that described in claim 3, whereby the method may particularly

be applied to a scroll bar to comprise: establishing an object fundamental path, i.e. a groove,

representing the path of motion of a scroll bar "thumb;" establishing a device fundamental path

in correspondence with the groove; detecting motion of an interface device; moving the thumb in

the computer application along the groove responsive to a component of interface device motion

along the device fundamental path; and applying a force to the input device responsive to a

component of interface device motion not along the device fundamental path, and responsive to

interaction of the thumb with the application. Rosenberg, however, does not explicitly disclose

that additional object fundamental paths may be established, as is expressed in claim 10.

Like Rosenberg, Bertram discusses scroll bars (for example, see column 1, line 19 –

column 2, line 13). Regarding the claimed invention, Bertram teaches that a graphical user

interface may comprise a plurality of scroll bars, each having a thumb (for example, see the

scroll bars represented by reference numbers 64 and 70 in figure 3).

Therefore, it would have been obvious to one of ordinary skill in the art, having the

teachings of Rosenberg and Bertram before him at the time the invention was made, to modify

the interface by Rosenberg to include a plurality of scroll bars, as done by Bertram. It would

have been advantageous to one of ordinary skill to utilize such a combination because a plurality

of scroll bars allow the user to scroll the display in more than one dimension, such as for

example, they allow the user to scroll both horizontally and vertically, as is demonstrated by

Bertram. Thus with the method of Rosenberg applied to a plurality of scroll bars, each scroll bar

having a "groove" associated therewith, a second object fundamental path, i.e. groove,

representing the path of motion of a second thumb is established; a second device fundamental

path in correspondence with the second groove is established; it is determined if either

fundamental path is active, or in other words, if the user has selected one of the thumbs using a

cursor; the selected thumb is moved along its associated groove responsive to a component of

interface device motion along the active device fundamental path; and a force is applied to the

interface device responsive to a component of interface device motion not along the active

device fundamental path.

       Claims 14 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the U.S.

Patent of Rosenberg, which is described above, and also over U.S. Patent No. 6,288,705, which

is attributed to Rosenberg et al. (and hereafter referred to as "Rosenberg II"). Regarding claim

14, Rosenberg teaches a method for allowing a user of a haptic input device to affect the motion

of an object in a computer application, whereas described above (see e.g. the rejection for claim

3) the method comprises: establishing an object fundamental path representing a math of motion

of the object in the computer application; establishing a device fundamental path in

correspondence with the object fundamental path; detecting a motion of the haptic input device;

moving the object in the computer application along the object fundamental path responsive to a component of haptic input device motion along the device fundamental path; and applying a first force to the haptic input device responsive to a component of haptic input device motion not along the device fundamental path. Rosenberg, however, does not explicitly teach applying a force to the haptic input device to urge the haptic input device to a starting region of the range of motion of the haptic input device, whereas recited in claim 14, the starting region comprises a region of the range of motion of the haptic input device such that, when the object is moved along the full object fundamental path is correspondence with motion of the haptic input device along the device fundamental path, motion of the haptic input device outside its range of motion will not be required.

Like Rosenberg, Rosenberg II similarly describes a haptic user interface (for example, see column 5, line 56 – column 6, line 9). Rosenberg II particularly notes that in such haptic interfaces, various points on the display may become unreachable via the range of motion of the haptic input device (for example, see column 4, lines 37-64; and column 29, line 31 – column 30, line 14). Rosenberg II alleviates this problem via various embodiments, each applying a force to the haptic input device, either automatically or by the user, to urge the haptic input device towards a particular region of the range of motion of the haptic input device, such that movement of the haptic input device starting in this particular region will not require movement of the haptic input device outside its range of motion (for example, see column 30, line 47 – column 32, line 43; and column 37, lines 44-61). Such a particular region is considered a "starting region," like that recited in claim 14.

Consequently, it would have been obvious to one of ordinary skill in the art, having the

teachings of Rosenberg and Rosenberg II before him at the time the invention was made, to

modify the haptic interface taught by Rosenberg, such that forces may be applied to the haptic

input device to prevent it from reaching the limits of its range of motion, as is taught by

Rosenberg II and described above. It would have been advantageous to one of ordinary skill to

utilize this combination because if the input device reaches its limits, it reduces the realism

provided by the force feedback, as is taught by Rosenberg II (for example, see column 4, lines

37-64).

In reference to claim 25, Rosenberg teaches defining a motion-initiation region, namely a

"force field," which comprises a portion of the interface device range of motion (see column 40,

lines 21-41). In response to determining that the input device is within this force field, an

"attractive" force may be applied to the device urging it to a device fundamental path

corresponding to a groove (see column 59, lines 49-63).

Claims 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over the U.S. Patent

of Rosenberg, which is described above, and also over U.S. Patent No. 6,583,782, which is

attributed to Gould et al. (and hereafter referred to as "Gould"). As shown above, Rosenberg

teaches a method like that recited in claim 3, wherein an object fundamental path, namely a

groove, is established to represent a path of motion of an object in a computer application, and a

corresponding device fundamental path is established to represent a path an interface device

must take in order to move the object along the object device fundamental path. This object may

be, for instance, a cursor displayed within a graphical user interface. Rosenberg, however, does

not explicitly disclose that the device fundamental path has a different shape than the object

fundamental path, as is recited in claim 15.

Like Rosenberg, wherein force feedback is provided to the interface device in response to

graphical objects encountered by the cursor, Gould teaches providing "virtual force feedback" to

the user in response to graphical objects encountered by the cursor (for example, see column 6,

lines 42-62). Such virtual force feedback is applied by affecting the movement of the cursor,

relative to the movement of the interface device (see column 8, lines 31-42). For example,

Gould discloses that such virtual force feedback can be applied to a thumb or an elliptical

selector wheel displayed within a graphical user interface (See column 16, lines 5-24). Virtual

force feedback, similar to the groove force described by Rosenberg, may be applied to keep the

cursor on the wheel. However in the case of virtual force feedback, the user does not have to

move the input device in the exact circular shape of the wheel in order to keep the cursor on the

wheel – the cursor is maintained on the wheel in response to attractive and repelling virtual

forces provided by the wheel. Thus regarding the claimed invention, Gould teaches that the path

in which the cursor moves on the screen, i.e. the object fundamental path, may have a different

shape than the path in which the interface device moves, i.e. the device fundamental path (for

example, see figure 10A, and its corresponding description in column 16, lines 48-60).

Therefore, it would have been obvious to one of ordinary skill in the art, having the

teachings of Rosenberg and Gould before him at the time the invention was made, to modify the

graphical user interface taught by Rosenberg to include virtual force feedback, or in other words,

such that the device fundamental path does not have to be the same shape as the object

fundamental path, as is taught by Gould. It would have been advantageous to one of ordinary

skill to utilize such a combination because such virtual force feedback reduces "background

mechanical noise" as is taught by Gould (see column 6, line 63 – column 7, line 3). Background

mechanical noise may reduce productivity, even with force feedback devices like that of

Rosenberg (see column 2, lines 4-9; and column 1, lines 31-41 of Gould).

Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over the

combination of Rosenberg and Gould, which is described above, and also over U.S. Patent No.

6,552,722, which is attributed to Shih et al. (and hereafter referred to as "Shih"). As described

above, Rosenberg and Gould teaches a method like that described in claim 15, whereby a device

fundamental path is established, in correspondence with a defined "groove," to represent a path

of movement of an interface device. While Rosenberg discloses that the groove, and

consequently the corresponding device fundamental path, may be defined along a given degree

of freedom of the interface device (see, for example, column 32, lines 44-55; and column 38,

lines 38-51), neither Rosenberg nor Gould explicitly disclose that the device fundamental path

defines a curve in three-dimensions, a curve in two-dimensions, or a surface in three-dimensions,

as is recited in claims 16-18, respectively.

Like Rosenberg, Shih teaches establishing an object fundamental path, which is defined

by a "geometric constraint," and which represents a path of motion of a "virtual tool" object in a

user interface (see the abstract of Shih). As a haptic interface device is used to affect the motion

of the virtual tool in the interface (see the abstract of Shih), a corresponding device fundamental

path representing the path of motion required by the interface device to move the virtual tool

along the object fundamental path is considered to be likewise established. As also done by

Rosenberg, a force is applied to the interface device of Shih responsive to a component of input

device motion not along this device fundamental path (for example, see column 37, line 41 –

column 38, line 11). Regarding the claimed invention, Shih teaches that the object fundamental

path, and consequently its corresponding device fundamental path, as defined by a geometric

constraint, may define a point, line, curve, surface, or space representation, understood to be

within two- or three- dimensions (for example, see column 37, lines 15-40; and column 8, line 21

– column 8, line 23).

It would have therefore been obvious to one of ordinary skill in the art, having the

teachings of Rosenberg, Gould, and Shih before him at the time the invention was made, to

modify the device fundamental path taught by Rosenberg and Gould such that it defines a curve

in three-dimensions, defines a curve in two-dimensions, or defines a surface in three-dimensions,

as is done by Shih. It would have been advantageous to one of ordinary skill to utilize such a

combination because such device fundamental paths are applicable in a plurality of applications,

specifically CAD applications, as is taught by Shih (for example, see column 1, line 61 – column

2, line 9). Modifying Rosenberg and Gould by Shih would thus create a more general, and more

useful, technique for providing feedback.

Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination

of Rosenberg and Gould, which is described above, and also over Rosenberg II, which is

additionally described above. As described above, Rosenberg and Gould teach a method like

that of claim 15, whereby a device fundamental path and an object fundamental path,

representing the path of an input device and a corresponding display object, respectively, may

have different shapes. Neither Rosenberg nor Gould, however, explicitly discloses that the

correspondence between the device fundamental path and the object fundamental path is not one

to one, as is recited in claim 34.

Like Rosenberg and Gould, Rosenberg II describes a device fundamental path and an

object fundamental path, representing the path of an input device and a corresponding display

object, respectively. Regarding the claimed invention, Rosenberg II discloses that the device

fundamental path and the object fundamental path may comprise different shapes (for example,

see column 26, lines 9-41), and that the correspondence there between may not be one to one (for

example, see column 18, line 60 – column 19, line 17).

It would have therefore been obvious to one of ordinary skill in the art, having the

teachings of Rosenberg, Gould, and Rosenberg II before him at the time the invention was made,

to modify the correspondence between the device fundamental path and the object fundamental

path, as is done by Rosenberg II. It would have been advantageous to one of ordinary skill to

utilize this combination because, not having a one to one correspondence between the device

fundamental path and the object fundamental path can compensate for differences in size

between the display space and the range of movement of the input device, as is taught by

Rosenberg (for example, see column 18, line 60 – column 19, line 17).

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No.

6,220,963, which is attributed to Meredith, and also over the U.S. Patent of Rosenberg, which is

described above. In general, Meredith describes a computerized pool cue input device for use

with computer-simulated games of pool (see column 2, lines 6-13). The movement of this input

device results in corresponding movement of a displayed object, namely the tip of a cue stick, on

a computer display (see column 5, lines 16-30). Thus regarding claim 32, Meredith discloses: a

computer application which comprises a pool simulation; an object in the in the computer

application, wherein the object comprises a pool cue; an object fundamental path representing a

path of motion in the computer application, wherein the object fundamental path comprises a

path suited for perception of the motion of a pool cue. In response to detecting the motion of the

input device, i.e. computerized pool cue, the object in the application is moved along the object

fundamental path responsive to a component of input device motion along the device

fundamental path. Meredith, however, does not explicitly teach establishing an object

fundamental path and a device fundamental path, such that a force is applied to the input device

responsive to a component of input device motion not along the device fundamental path, as is

recited in claim 3, upon which claim 32 depends.

As described above, Rosenberg teaches establishing an object fundamental path, namely

a groove, and a corresponding device fundamental path, such that an object in an application is

moved along the object fundamental path responsive to a component of input device motion

along the device fundamental path, and such that a force is applied to the input device responsive

to a component of input device motion not along the device fundamental path. Moreover,

Rosenberg teaches that such a force may be applied to a computerized pool cue input device (for

example, see column 13, line 65 – column 14, line 9).

Consequently, it would have been obvious to one of ordinary skill in the art, having the

teachings of Meredith and Rosenberg before him at the time the invention was made, to modify

the input device and simulation taught by Meredith such that force feedback is applied to the

input device response to input device motion not along an established device fundamental path, as is done by Rosenberg. It would have been advantageous to one of ordinary skill to utilize such a combination because such force feedback can reduce the difficulty of required "targeting" tasks, thus facilitating interaction with the computer application, particularly for users having dexterity-debilitating conditions, as is taught by Rosenberg (for example, see column 44, lines 50-64).

Claims 31 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,277,030, which is attributed to Baynton et al. (and hereafter referred to as "Baynton"), and also over the combination of Rosenberg and Meredith, which is described above. In general, Baynton describes a computerized golf swing apparatus, which provides force feedback to correct a user's golf swing (for example, see the abstract). Baynton more specifically teaches: establishing a device fundamental path, namely a predetermined golf swing path; detecting motion of an input device; and applying force to the input device responsive to a component of the input device motion not along the device fundamental path (see column 3, lines 17-52). However, Baynton does not explicitly teach implementing such a golf swing apparatus as an input to an application comprising a golf simulation, as is expressed in claim 31. Baynton therefore does not teach: establishing an object fundamental path representing a path of motion of an object in the computer application, wherein the object comprises a golf club, wherein the object fundamental path comprises a path suited for perception of the swing of the golf club, and wherein the object moves along the object fundamental path responsive to a component of input device motion along the device fundamental path, as is expressed in claims 3

and dependent claim 31. Moreover, Baynton does not teach that the object fundamental path and the device fundamental path have different shapes, as is recited in claim 38.

Similar to Baynton, Rosenberg and Meredith teach implementing an input apparatus, which comprises a pool cue, and which provides for feedback to the user. Rosenberg and Meredith particularly teach implementing such an apparatus as an input to an application comprising a pool simulation by: establishing an object fundamental path representing a path of motion of an object in the computer application, wherein the object comprises a pool cue, wherein the object fundamental path comprises a path suited for perception of the motion of the pool cue, wherein the object moves along the object fundamental path responsive to a component of input device motion along the device fundamental path; and wherein force is applied to the input apparatus in response to interaction of the object with other objects in the application. It is understood that the object fundamental path and the device fundamental path may have different shapes, with discrepancies caused by, for example, distortions in the display screen displaying the object.

It would have been obvious to one of ordinary skill in the art, having the teachings of Baynton, Meredith, and Rosenberg before him at the time the invention was made, to modify the input device taught by Baynton such that it is implemented in a golf simulation, analogous to the pool simulation of Meredith and Rosenberg. In other words, it would have been obvious to modify the golf swing apparatus of Baynton such that it serves as an input to an application comprising a golf simulation, specifically by: establishing an object fundamental path representing a path of motion of an object in the computer application, wherein the object comprises a golf club, wherein the object fundamental path comprises a path suited for

perception of the motion of the golf club, wherein the object moves along the object fundamental

path responsive to a component of input device motion along the device fundamental path, and

wherein force is applied to the input apparatus in response to interaction of the object with other

objects in the application. It would have been advantageous to one of ordinary skill to utilize this

combination, because using the apparatus as an input to such a simulation would allow the user

to view the results of his or her swing, as is demonstrated by Meredith. Thus, in addition to

providing entertainment value, the simulation would allow the user to better improve his or her

swing.

Response to Arguments

The Examiner acknowledges the Applicants' amendments to claims 3, 12-14, 20-23, 26,

28-29, and 35.

The Applicants generally argue that the pending claims have limitations not taught by the

art of record. While the Applicants' amendments and arguments are sufficient to overcome the

U.S. Patent to Stewart et al. cited in the previous Office Action, the Examiner respectfully

submits that the pending claims do not overcome the other references cited by that Office Action.

The Examiner's rationale is indicated in the above rejections.

Applicant's arguments filed on July 9, 2009 have thus been fully considered but are not

persuasive.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Blaine Basom whose telephone number is (571)272-4044. The examiner can normally be reached on Monday through Friday, from 8:30 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kieu Vu can be reached on (571)272-4057. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BTB/
10/1/2009

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